IN THE CLAIMS

Please amend the claims as follows:

1-19. (Canceled)

20. (Withdrawn): A crystallization method comprising:

illuminating a phase modulation element having a phase distribution based on a phase modulation unit which is optically smaller than a radius of a point spread distribution range of an image formation optical system when converted to an image formation surface; and

irradiating a polycrystal semiconductor film or an amorphous semiconductor film with light beams having a predetermined light intensity distribution through the image formation optical system arranged in a light path between the phase modulation element and the polycrystal semiconductor film or the amorphous semiconductor film, thereby generating a crystallized semiconductor film.

21. (Withdrawn): A crystallization method comprising:

illuminating a phase modulation element having a phase distribution based on a phase modulation unit which is optically smaller than a radius of a point spread distribution range of an image formation optical system when converted to an image formation surface; and

forming a predetermined light intensity distribution on a predetermined surface through the image formation optical system arranged in a light path between the phase modulation element and the predetermined surface.

22. (Withdrawn): A phase modulation element having a phase distribution based on a phase modulation unit having a predetermined size, comprising:

a first area having a first phase value; and

a second area having a second phase value,

wherein the phase distribution is defined by a change in area shares of the first area and the second area depending on each position.

23. (Withdrawn): The phase modulation element according to claim 22, wherein the phase modulation element has a plurality of cells, and area shares of the first area and the second area in each cell vary in accordance with each cell.

24. (Withdrawn): The phase modulation element according to claim 22, wherein the phase modulation element comprises a plurality of pixels each having a fixed phase value, and the number of pixels having the same phase value per unit range varies in accordance with each unit range.

25. (Withdrawn): The phase modulation element according to claim 22, wherein the phase modulation element comprises a plurality of stripe-like areas each having a fixed phase value, and a width of each stripe-like area varies along a longitudinal direction.

26. (Withdrawn): The phase modulation element according to claim 22, wherein the phase modulation element has a line-and-space pattern which includes a plurality of line portions each having the first phase value and a plurality of space portions each having the second phase value, and a ratio in width of the line portion and the space portion which are adjacent to each other varies along a widthwise direction.

27. (Withdrawn): A phase modulation element having a phase distribution based on a phase modulation unit having a predetermined size, comprising:

a plurality of divided areas each having a fixed phase value,

wherein each of the divided areas has a phase distribution that the phase value cyclically varies in accordance with each divided area.

28. (Withdrawn): The phase modulation element according to claim 27, wherein the phase modulation element comprises a plurality of pixels each having a fixed phase value, and the phase value of each pixel varies in accordance with each pixel.

29. (Withdrawn): The phase modulation element according to claim 27, wherein the phase modulation element has a line-and-space pattern, and a the phase value varies in accordance with each line portion.

30. (Withdrawn): A phase modulation element having a phase distribution based on a phase modulation unit having a predetermined size, comprising:

a first stripe-like area which has a first phase distribution and extends in a direction along which a phase varies; and

a second stripe-like area which has a second phase distribution and extends in the direction along which the phase varies,

wherein the first stripe-like area and the second stripe-like area are adjacent to each other with a border line parallel with the direction along which the phase varies therebetween, and an average phase value on the first stripe-like area side is substantially different from an average phase value on the second stripe-like area side in a local area on the border line.

31. (Withdrawn): The phase modulation element according to claim 30, wherein the first stripe-like area and the second stripe-like area are configured to have substantially the

same light intensity distributions which are formed in accordance therewith, the average phase value on the first stripe-like area side is substantially different from the average phase value on the second stripe-like area side in a first local area on the border line corresponding to a part where a light intensity in the light intensity distribution is small, and the average phase value on the first stripe-like area side is substantially equal to the average phase value on the second stripe-like area side in a second local area on the border line corresponding to a part where a light intensity in the light intensity distribution is large.

32. (Withdrawn): The phase modulation element according to claim 30, wherein the first stripe-like area and the second stripe-like area have a line-and-space pattern, each line portion has a first phase value, each space portion has a second phase value, and a ratio in width of the line portion and the space portion which are adjacent to each other varies along a widthwise direction.

33. (Withdrawn): The phase modulation element according to claim 31, wherein the first stripe-like area and the second stripe-like area have a line-and-space pattern, each line portion has a first phase value, each space portion has a second phase value, and a ratio in width of the line portion and the space portion which are adjacent to each other varies along a widthwise direction.

34. (Withdrawn): The phase modulation element according to claim 30, wherein the first stripe-like area and the second stripe-like area have a line-and-space pattern, and the phase value of the line portion varies in accordance with each line.

35. (Withdrawn): The phase modulation element according to claim 31,

wherein the first stripe-like area and the second stripe-like area have a line-and-space pattern, and the phase value of the line portion varies in accordance with each line.

36. (Withdrawn): The phase modulation element according to claim 22, wherein the phase modulation element comprises isolated areas each of which has a phase value which is substantially different from that of a periphery in accordance with parts where a light intensity in a light intensity distribution to be formed is small.

37. (Withdrawn): A device comprising:

a semiconductor film manufactured by

a crystallization method, the crystallization method comprising: illuminating a phase modulation element having a phase distribution based on a phase modulation unit which is optically smaller than a radius of a point spread distribution range of an image formation optical system when converted to an image formation surface; and forming a predetermined light intensity distribution on a predetermined surface through the image formation optical system arranged in a light path between the phase modulation element and the predetermined surface.

38. (Withdrawn): A display apparatus comprising:

a pair of substrates joined to each other with a predetermined gap therebetween;

an electro-optic material held in the gap;

an opposed electrode formed on one of the substrates; and

a semiconductor thin film which can provide pixel electrodes formed on the other substrate and thin film transistors which drive the pixel electrodes,

wherein the semiconductor thin film is

a semiconductor film crystallized by irradiating the polycrystal semiconductor film or the amorphous semiconductor film with light beams having a predetermined light intensity distribution through a phase modulation element in which a phase of outgoing light beams relative to incident light beams varies depending on each position and an image formation optical system.

39-41. (Canceled)

42. (New): A crystallization apparatus, comprising:

a phase modulation element configured to modulate a phase of outgoing light beams relative to incident light beams at a constant period;

an illumination system configured to generate the incident light beams entering the phase modulation element;

an image formation optical system provided on an outgoing radiation side of the phase modulation element, the image formation optical system being configured to provide a light intensity distribution of a pattern in which a light intensity is at a minimum at a central position and increases linearly towards a periphery in each unit area, for a focal plane; and

a stage configured to support a substrate including a non-single crystal semiconductor film provided on an outgoing radiation side of the image formation optical system, wherein

the phase modulation element includes a phase modulation unit optically smaller than a radius of a point spread distribution range of the image formation optical system to provide the light intensity distribution of the pattern in which each unit area differs at the constant period, and the outgoing light beams which repeat the light intensity distribution of the pattern, are imaged on a non-monocrsytalline semiconductor film to melt an irradiation area,

to grow crystals, by generating a crystalline nucleus where the intensity of light is at the minimum in the light intensity distribution of the pattern, along a direction in which the light intensity increases, and wherein

the phase modulation unit, when the image formation optical system has a homogeneous circular pupil and no aberration, has the following relationship between the point spread function ASF of the image formation optical system and the pupil function:

$$ASF(x, y) \propto 2J_1(2\pi/\lambda \cdot NA \cdot r) / (2\pi/\lambda \cdot NA \cdot r)$$

where $r = (x^2 + y^2)^{1/2}$, J_1 indicates a Bessel function, λ indicates a wavelength of light beams, and NA indicates an image side numeral aperture of the image formation optical system.

43. (New): The crystallization apparatus according to claim 42, wherein

the phase modulation element includes a plurality of pixels, each pixel being smaller than the radius of the point spread distribution range, arranged in a pixel array, having a predetermined phase value, and being regularly placed in vertical and horizontal directions.

44. (New): The crystallization apparatus according to claim 43, wherein

an area occupancy, which determines the phase value of each pixel, is at a minimum in a pixel which makes the light intensity minimum at a center position in each unit area.

45. (New): The crystallization apparatus according to claim 43, wherein

an area occupancy, which determines the phase value of each pixel, is at a maximum in a pixel located most distant from a pixel which makes the light intensity minimum at a center position in each unit area.

46. (New): The crystallization apparatus according to claim 42, wherein the phase modulation element includes a plurality of first and second stripe-like areas, each strip-like area being smaller than the radius of the point spread distribution range, wherein

an area occupancy, which determines the phase values of each of the first and second areas, increases in order from a site of crystalline nucleus generation, where the light intensity of the intensity distribution of the pattern is at the minimum, along with a direction in which the light intensity increases.

47. (New): The crystallization apparatus according to claim 42, wherein the phase modulation element includes a line and a space, whose widths are defined smaller than the radius of the point spread distribution range, each line and space including a phase value of a corresponding position in each unit area, and the phase value increasing in order from a site of crystalline nucleus generation, where the light intensity of the intensity distribution of the pattern is at the minimum, along with a direction in which the light intensity increases.